CLAIMS

We claim:

1. A method for identifying optimal mapping of logical links to the physical topology of a network, the method comprising:

obtaining one or more mapping options for mapping multiple logical links between one or more pairs of network nodes onto physical paths that are at least relatively disjoint;

obtaining a maximum time delay allowed between each pair of network nodes; and

correlating the mapping options with the maximum time delay to identify optimal mapping of logical links to the physical topology of a network.

2. The method of claim 1, further comprising:

obtaining a relative time delay allowed between two or more physical paths.

3. The method of claim 2, further comprising:

correlating the mapping options with the maximum time delay and the relative time delay to identify optimal mapping of logical links to the physical topology of a network.

4. The method of claim 3, further comprising:

obtaining the availability of wavelengths in a network.

5. The method of claim 4, further comprising:

correlating the mapping options with the maximum time delay, the relative time delay and the wavelength availability to identify optimal mapping of logical links to the physical topology of a network.

6. The method of claim 5, further comprising:

obtaining a priority order of the network node pairs.

7. The method of claim 6, further comprising:

correlating the mapping options with the maximum time delay, the relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network.

8. The method of claim 7, wherein the correlation is performed using an integer linear program.

9. The method of claim 7, wherein the correlation is performed using a Tabu search methodology.

10. The method of claim 7, wherein the correlation is performed to identify the optimal mapping for a large Internet network backbone.

11. The method of claim 7, wherein the correlation is utilized to identify where new fibers or wavelengths need to be added to the network topology.

12. One or more computer-readable media having computer-executable instructions for performing the method recited in claim 1.

13. One or more computer-readable media having computer-executable instructions for performing the method recited in claim 7.

14. A computer system for identifying optimal mapping of logical links onto the physical topology of a network, the system comprising:

a practical constraint module comprising a mapping option sub-module for obtaining one or more mapping options for multiple logical links between one or more pairs of network nodes onto physical paths that are at least relatively disjoint and a maximum time delay sub-module for obtaining a maximum time delay allowed between the each pair of network nodes; and

a correlation module coupled with the practical constraint module for correlating the mapping options with the maximum time delay to identify optimal mapping of logical links to the physical topology of a network.

15. The computer system of claim 14, wherein the practical constraint module further comprises a relative time delay sub-module for obtaining the relative time delay allowed between two or more physical paths.

16. The computer system of claim 15, wherein the correlation module coupled with the practical constraint module correlates the mapping options with the maximum time delay and the relative time delay.

17. The computer system of claim 16, wherein the practical constraint module further comprises a wavelength sub-module for obtaining the wavelength availability in a network.

18. The computer system of claim 17, wherein the correlation module coupled with the practical constraint module correlates the mapping options with the maximum time delay, the relative time delay allowed and wavelength availability.

19. The computer system of claim 18, wherein the correlation module utilizes an integer linear program to perform the correlation.

20. The computer system of claim 18, wherein the correlation module utilizes a Tabu search methodology to perform the correlation.

21. The computer system of claim 18, wherein the correlation is performed to identify the optimal mapping for a large Internet network backbone.

22. A system for identifying optimal mapping of logical links to the physical topology of a network, the system comprising:

means for obtaining one or more mapping options for mapping multiple logical links between one or more pairs of network nodes onto physical paths that are at least relatively disjoint;

means for obtaining a maximum time delay allowed between the each pair of network nodes; and

means for correlating the mapping options with the maximum time delay to identify optimal mapping of logical links to the physical topology of a network.

23. The system of claim 22, further comprising:

means for obtaining a relative time delay allowed between two or more physical paths.

24. The system of claim 23, further comprising:

means for correlating the mapping options with the maximum time delay and the relative time delay to identify optimal mapping of logical links to the physical topology of a network.

25. The system of claim 24, further comprising:

means for obtaining the availability of wavelengths in the network.

26. The system of claim 25, further comprising:

means for correlating the mapping options with the maximum time delay, the relative time delay and the wavelength availability to identify optimal mapping of logical links to the physical topology of a network.

27. The system of claim 26, further comprising:

means for obtaining a priority order of the network node pairs.

28. The system of claim 27, further comprising:

means for correlating the mapping options with the maximum time delay, the relative time delay, the wavelength availability and the priority order of the network node pairs to identify optimal mapping of logical links to the physical topology of a network.